



# SERVICE MANUAL

## **D-150A SERIES II DUAL-CHANNEL POWER AMPLIFIER**

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## SECTION 1: GENERAL INFORMATION

### 1.1 Introduction

This manual contains service information on the D-150A II. The "II" designation indicating the second series of this popular Crown offering.

#### **Caution:**

**This manual is produced to support the work of experienced and qualified service technicians at authorized Crown Repair Centers. It does not provide the type of detailed information that an inexperienced person would require to work on this unit.**

Schematic diagrams, exploded view drawings, parts listing and checkout procedures are provided for the disassembly, inspection and repair of the amplifier. For complete installation and operation procedures, refer to the D-150A II Instruction Manual.

### 1.2 General Operation

The D-150A II is a single or dual channel power amplifier designed for use in medium power systems which demand high accuracy and wide frequency response. The D-150A II provides precision amplification of frequencies from DC to 20kHz, with extremely low harmonic and intermodulation distortion, low noise, and high "damping factor".

Output capability is 75 watts per channel minimum RMS into an 8 ohm load. When the amplifier is bridged and operating as a mono channel unit, output power reaches 250 watts minimum RMS into an 8 ohm load.

## SECTION 2: SPECIFICATIONS

### 2.1 General Specifications

**Hum and Noise (20Hz - 20kHz):** 110dB below rated output.

**Phase Response:** +0, -15 degrees, DC-15kHz at 1 watt.

**Input Impedance:** 25K ohms, +/- 30%.

**Amplifier Output Protection:** Short, mismatched, and open circuit proof. Limiting is instantaneous with no flyback pulses, thumps, cutouts, etc. No premature limiting on transients.

**Overall Protection:** AC line fused. Thermal switch in AC line protects against overheating caused by insufficient ventilation. Controlled slewing-rate voltage amplifiers protect overall amplifier against RF burnouts. Input overload protection is furnished by an internal resistor at inputs of amp.

**DC Output Offset (Shorted Input):** 10 millivolts or less, internally adjustable to zero.

**Turn-On:** Instantaneous, with minimum thumps and no program delay.

**Power Supply:** Massive computer-grade filter capacitors store over 20 joules of energy. Two regulated supplies for complete isolation and stability.

**Power Requirements:** Requires 50 - 400Hz AC on 100, 120, 200, 220, or 240V +/-10% operation. Draws 30 watts or less on idle. Maximum AC power requirement: 750 watts.

**Heatsinking:** The entire amplifier is used as a heatsink. 3/16" thick chassis acts as a heatsink along with auxiliary fins.

**Chassis:** All aluminum construction for maximum heat conduction and minimum weight.

**Controls:** Independent level controls are mounted on the front panel. Power switch with associated pilot light is on front panel. Non-interacting DC balance controls are mounted on main PC board under electronics cover. A mono-stereo channel switch is located next to the input jacks on the rear panel.

**Connectors:** Input - 1/4 inch phone jacks. Output - color coded binding posts. AC line - 3-wire (grounded) male connector on 5 foot cable.

**Dimensions:** 19" (48.3cm) inches long, 5-1/4" (13.3cm) inches high, 8-3/4" (22.2cm) inches deep (from mounting surface of front panel).

**Weight:** 24 pounds (10.9 kg).

**Finish:** Polyester vinyl coated front panel with Lexan insert.

### 2.2 Monaural Specifications

**Output Power:** 250 watts minimum RMS into an 8 ohm load over a bandwidth of 1Hz - 20kHz at a rated RMS sum total harmonic distortion of 0.05% of the fundamental output voltage (both channels operating).

**Frequency Response 1kHz Power:** +/- .15dB DC - 20kHz at 1 watt into 16 ohms; +/- 1dB DC - 60kHz.

**Harmonic Distortion:** Less than 0.001% from 20 - 400Hz and increasing linearly to 0.05% at 20kHz at 160 watts into 16 ohms.

**I.M. Distortion S.M.P.T.E. (60Hz - 7kHz 4:1):** Less than 0.05% from 0.01 watts to 0.25 watts and less than 0.01% from 0.25 watts to 160 watts into 16 ohms, per channel.



**Slewing Rate:** 12 volts per microsecond.

**Damping Factor:** Greater than 400, DC-400Hz into 16 ohms.

**Output Impedance:** Less than 30 milliohms in series with less than 6 microhenries.

**Load Impedance:** Rated for 8 ohm usage; safely drives any load including completely reactive loads.

**Voltage Gain:** 41.2  $\pm$  2% or 32.3  $\pm$  0.2dB at maximum gain. (See Section 6.3 for possible modifications)

**Input Sensitivity:** 1.19 volts  $\pm$  2% for 250 watts into 8 ohms. (Might be modified to .775 volts with RMS conversion. See Section 6.3)

**Output Signal:** Balanced, single channel.

**Damping Factor:** Greater than 400, DC - 400Hz into 8 ohms.

**Output Impedance:** Less than 15 milliohms in series with less than 3 microhenries.

**Load Impedance:** Rated for 8 ohm usage; safely drives any load, including completely reactive loads.

**Voltage Gain:** 20.6  $\pm$  2% or 26.3  $\pm$  .2dB at maximum gain. (See Section 6.3 for possible modifications)

**Input Sensitivity:** 1.19 volts  $\pm$  2% for 80 watts into 8 ohms. (Might be modified to .775 volts with RMS conversion. See Section 6.3)

**Output Signal:** Unbalanced, dual channel.

### 2.3 Stereo Specifications

**Output Power:** 75 watts per channel minimum RMS (both channels operating) into an 8 ohm load over a bandwidth of 1Hz - 20kHz at a rated RMS sum total harmonic distortion of 0.05% of the fundamental output voltage.

**Frequency Response:**  $\pm$  1dB DC - 20kHz at 1 watt into 8 ohms;  $\pm$  1dB DC - 100kHz.

**1kHz Power:** 90 watts RMS into 8 ohms, per channel, both channels operating. 0.1% total harmonic distortion.

**Harmonic Distortion:** Less than 0.001% from 20Hz - 400Hz, and increasing linearly to 0.05% at 20kHz at 80 watts RMS per channel into 8 ohms.

**IM Distortion S.M.P.T.E. (60Hz - 7kHz 4:1):** Less than 0.05% from 0.01 watts to 0.25 watts and less than 0.01% from 0.25 watts to 80 watts into 8 ohms, per channel.

**Slewing Rate:** 6 volts per microsecond (slewing rate is the maximum value of the first derivative of the output signal, or the maximum slope of the output signal).

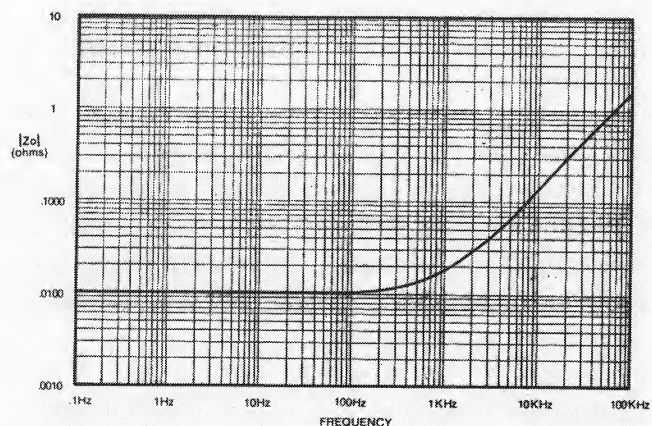


Illustration 2-1  
Nominal Output Impedance

D-150A II										
Configuration and Load	Type of test	FTC Continuous Average Power at .1% THD (see note 1)		Single Cycle Tone Burst Watts at <0.05% THD (see note 2)			40mS Tone Burst Watts at <0.05% THD (see note 3)			EIA Watts +/- 1db 1% THD (see note 4)
		20Hz-20KHz	80Kz	20Hz	60Hz	80Hz	20Hz	60Hz	80Hz	80Hz
Stereo per CHL (both chl powered)	4		150	115	155	205	115	150	145	160
	8	75	90	75	95	110	75	90	85	95
	16	50	50	45	50	55	45	50	50	55
Bridged Monaural (Balanced output)	8		305	285	340	415	285	310	295	320
	16	160	185	185	195	215	185	185	180	195

**Notes:**

1. Continuous power in the context of Federal Trade Commission testing is understood to be minimum of five minutes of operation. Harmonic distortion is measured as the RMS sum total as a percentage of the fundamental output voltage. This distortion specification applies for all wattage greater than 0.25 watts.
2. A single cycle of sine wave is presented to the amplifier and monitored for non-linear distortion. The average power during the burst is reported. Speakers must be able to withstand this level if they are to be safely used with this amplifier.
3. A 40 millisecond burst or two cycles of sine wave (whichever is of greater duration) is used and the power computed as the average power during the burst. The duty cycle of this test is 10 percent. This power level is a measure of how loud an amplifier is perceived by the hearing process.
4. EIA standard RS-490 (both channels driven)

Table 2-1  
Performance Chart



### SECTION 3: OPERATING CONTROLS AND ADJUSTMENTS

This section is a summary of D-150A II controls and adjustments along with a number of important precautions for proper operation.

#### 3.1 Operating Precautions

The following operating precautions must be followed to both protect the amplifier against damage and to obtain optimum service performance.

**Connections.** Use care in making connections, selecting signal sources and controlling the output level. Crown is not liable for damage to loads.

**Parallel Operation.** Never parallel the output with any other amplifier output or parallel the two channels of the D-150A II. Damage incurred by such operation is not covered under warranty.

**Transformer-Coupled Devices.** Never drive a transformer-coupled device or any other device which appears as a low frequency short (less than 3 ohms at DC) without a series isolating capacitor. Such operation may damage the device and/or needlessly waste output power.

**Grounding.** Do not connect the ground lead of the output cable to the input signal ground as oscillations may result from forming such a loop.

**Improper Outputs.** Never connect the output to a power supply, battery or power main.

**AC Mains.** Always operate the amplifier from AC mains of not more than 10% above or below the selected line voltage and only within the frequency range of 50 - 60Hz AC. Failure to comply with these frequency limits voids the warranty.

**Circuit Modifications.** Tampering in the circuitry by unqualified personnel or the making of unauthorized circuit modifications may seriously degrade the performance of the amplifier and possibly invalidate the warranty.

#### 3.2 Amplifier Controls

**Illustrations 3-1 and 3-2** are front and rear panel diagrams that show the controls described below.

**Power Switch/Indicator.** This button activates the D-150A II. The amber LED lights if proper power requirements are met.

**Input Level Controls.** Two controls channel the input signal through 25K ohm audio taper potentiometer.

**IOC Indicators.** The IOC (Input Output Comparator) displays are the two red front panel LED's that indicate such conditions as input signal overload, improper load impedance, or even an amplifier based problem. Intermittent flashing with music program peaks is normal. However, continuous illumination indicates a problem that requires attention.

**Input Phone Jacks.** Input signal hook-up is through conventional unbalanced 1/4" phone jacks. Refer to the Instruction Manual for complete information on connecting input lines to the unit.

**Mono/Dual Switch.** This rear panel switch sets operation as a single (mono) or dual (stereo) channel amplifier.

**Fuse.** Improper AC voltage or a variety of internal amplifier problems will blow the protective fuse. Fuse replacement is also required when converting to another AC main voltage. (See Section 6.5.6)

**AC Line Cord.** A three-wire, heavy duty AC cord and plug are standard equipment. Use caution with the third wire ground since it may introduce a ground loop in the system. A three-to-two plug adapter may be needed to prevent ground loop problems. Contact Crown Technical Service Department for further information if grounding problems are suspected in a particular system hook-up.

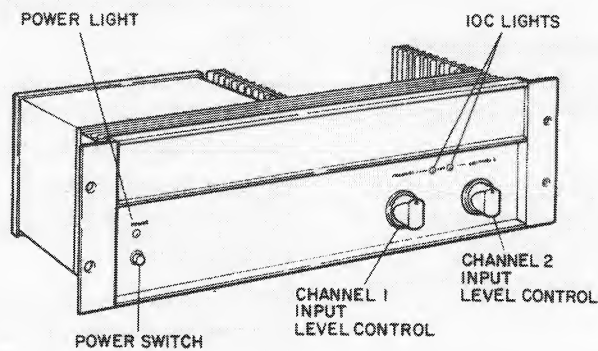
**Caution:**

Crown assumes no liability whatsoever for operation of ungrounded auxiliary equipment, nor for violation of UL or local electrical codes.

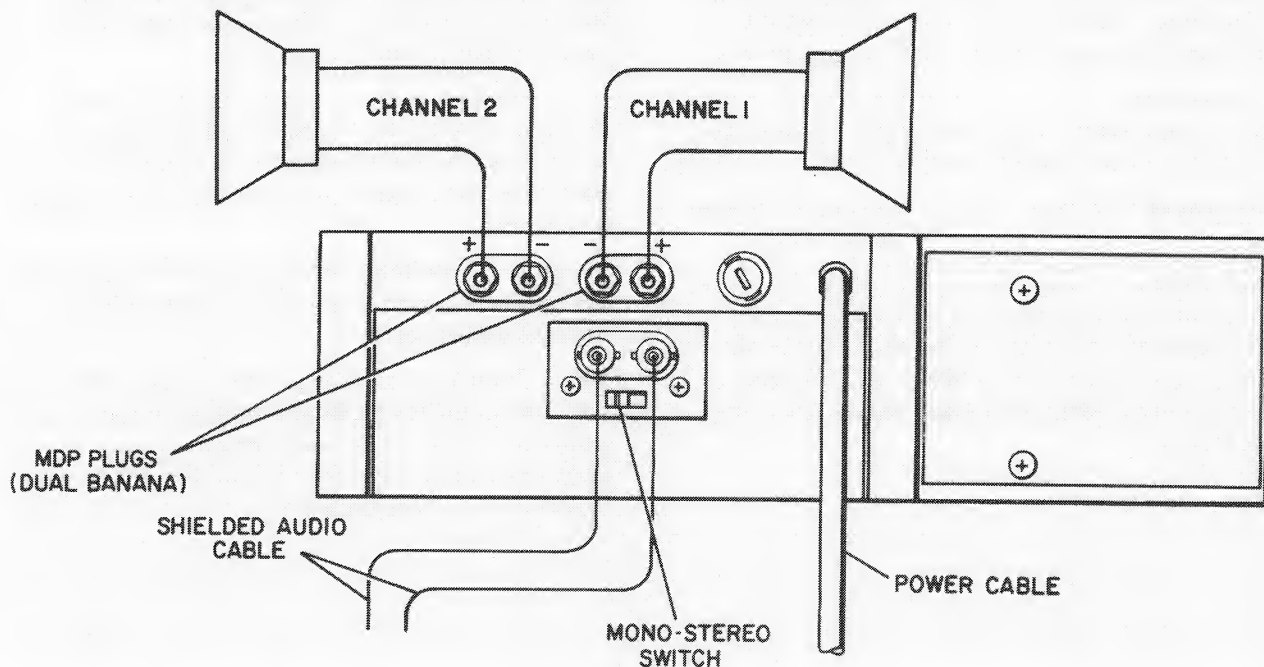
**Main Output Jacks.** Main output jacks are standard MDP banana style. Refer to the D-150A II Instruction Manual for complete information on connecting output lines and loads.

### 3.3 Circuit Board Modification

D-150A units with serial numbers 59429 and higher carry a circuit board with a number of modifications from earlier units. See Section 6.3 for a discussion of these modifications.



**Illustration 3-1**  
**Front Panel Controls**



**Illustration 3-2**  
**Rear Panel Connectors**